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ABSTRACT

Educators have conquered e-mail and surfing the net, now they are striving to provide quality distance education. Classes often form discussion groups and use listservs to facilitate interaction. A discussion group is little more than a mailing list. Messages can be mailed to the list address and are copied to each person on that mailing list. The list can be used for discussions and disseminating information. Many institutions have committed themselves to using technology to reach underserved or unserved distance learners by offering courses on the Web or through interactive TV. Rural and distance learners are the primary beneficiaries of these new means of education. Institutions are concerned with preserving the integrity and rigor of these new offerings. This paper discusses trends in information technology as well as means for transforming classroom interaction as the means of delivering education change. Although some students consider face-to-face interaction essential, many nontraditional learners believe distance education is the most feasible means of gaining a degree. Mottett (2000) stresses how important it is that instructors have realistic expectations concerning teaching distance education courses. Instructors need to realize that they will have less control over the delivery of their courses and how they will be impacted by reduced student responsiveness cues. Instructors need to familiarize distance learners with the technology and about their own nonverbal behavior. Instructors also need to become better listeners to maximize the responsiveness cues that they do receive. All instructors should try to work closely with administrators to ensure that new technologies effectively transmit both audible and visual nonverbal messages. Contains 13 references. (RS)

Trends in Information Technology and Future Prospects With Regard to Transforming Classroom Interaction

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Educators have conquered e-mail and surfing the net; now they are striving to provide quality distance education. Classes often form discussion groups and use listservs to facilitate interaction. A discussion group is little more than a mailing list. Messages can be mailed to the list address and are copied to each person on that mailing list. The list can be used for discussions and disseminating information. Many institutions have committed themselves to using technology to reach under-served or unserved distance learners by offering courses on the web or through interactive TV. Rural and distance learners are the primary beneficiaries of these new means of education. Institutions are concerned with preserving the integrity and rigor of these new offerings. This paper will discuss trends in information technology as well as means for transforming classroom interaction as the means of delivering education change. Although some students consider face-to-face interaction essential many nontraditional learners believe distance education is the most feasible means of gaining a degree.

Trends in Information Technology and Future Prospects With Regard to Transforming Classroom Interaction

Introduction

We live in a world of information technology which conquered national boundaries to reach almost everyone in our global community. As this world of technology advances, so is the educational profession. Marshall McLuhan's early predictions concerning the great impact of communication technology on distance or world affairs and his introduction of the "Global Village" concept have been realized. Becoming dominant features of most cultures, media technologies have influenced thought processes, behaviors, and interpersonal relationships. Among these technologies computer-mediated communication (CMC) has evolved as a dominant feature of interaction on a world-wide scale. Via computers, organizations as well as individuals are coordinating their activities toward accomplishing important goals and satisfying pressing and crucial human needs (Olaniran, 1998). CMC can be devoted to certain ways in which higher education demands may be best met. For instance, colleges and universities can use these technologies to enable the creation and delivery of asynchronous instructor-facilitated and self-paced learning programs which conveniently accommodate and help students to learn. This paper discusses trends in information technology, their effects on educational change, and means of transforming classroom interaction in higher education. Although a majority of students still consider face-to-face interaction as an essential means for good and well-rounded education, many nontraditional learners believe that distance education is the wave of the future and can be a feasible means of gaining degree in higher education.

Trends in Information Technology

There are many types of information technologies which greatly affect our lives on a daily basis. Hashem (2000) provided a brief description of some of these information technologies which can be used in combination for the purpose of distance teaching and learning:

- (1) **Voice mail** is a system for digitizing a spoken message and transmitting it over a network. It is capable of storing messages on disk for later retrieval.
- (2) **Facsimile (fax)** is a system which can transmit documents containing both text and graphic over ordinary telephone lines.
- (3) **Digital information services**, Powerful and far-reaching digital electronic services, can now enable networked microcomputers and workstation users to obtain information without leaving their offices or homes.
- (4) **Teleconferencing** allows a group of people to confer simultaneously via telephone or via electronic mail group communication software.
- (5) **Data-conferencing** is teleconferencing which allows two or more people at distant locations to work on the same document or data simultaneously.
- (6) **Video-conferencing** is teleconferencing which allows participants to see each other over video screens. All of these allow people to meet electronically even though they are thousands of miles apart.
- (7) **Groupware** provides functions and services to support the collaborative activities of work groups. It includes software for information sharing, electronic meetings, scheduling, e-mail, and

a network to connect the members of the group as they work on their own desktop computers, often in widely scattered locations. Groupware enhances collaboration by allowing the exchange of ideas (in the form of electronic messages) on a given topic. Members of a group can post requests for help from the group, and any member of the group can respond and can view the responses of other members of the group. The leading groupware product has been Lotus Notes from the Lotus Development Corporation. The Microsoft Corporation has developed Microsoft Exchange for this purpose and the Internet can be used for many groupware functions.

(8) **Internet** is a network of networks with a structure made up of millions of interconnected computers whose users can communicate with each other and share information. More than three million computers are hooked into the Internet. The value of the Internet lies precisely in its ability to easily and inexpensively connect so many diverse people from so many places all over the globe. The physical structure of the Internet uses fiber-optic cables, satellites, phone lines, and other telecommunication media to send data back and forth. Any user whose computer can be linked to an Internet site can be a part of the worldwide Internet community. Anyone who has an Internet address can log onto a computer and reach virtually every other computer on the network, regardless of location, computer type, or operating system. Individuals can receive many benefits from the Internet, including reducing communication costs, enhancing communication and coordination, and accelerating the distribution of knowledge. Internet communication capabilities include E-mail, Usenet News-groups, and Chatting.

(9) **Electronic mail (E-mail)** has drastically changed the way people communicate. It has improved the efficiency of interactions by reducing interruptions from the telephone and unscheduled personal contacts. In addition, messages can be distributed to multiple recipients easily and quickly without the inconvenience and delay of scheduling meetings. Because past messages can be saved, they can be reviewed if necessary. Also messages can be received at a convenient time to the recipient, thus, allowing recipient enough time to respond more clearly and to the point when dealing with very important matters. Opinions and feedback from remote experts and other interested people are easy to obtain, thus improving the quality of decisions and the probability of accepting those decisions. For groups whose members are scattered around the nation or the world, e-mail allows them to work around the time zone changes.

(10) **Usenet news-groups (forums)** are essentially on-line worldwide discussion groups in which people share information and ideas on a defined topic. Discussion takes place on large electronic bulletin boards where anyone can post messages on the topic for others to read. News-groups are organized into various hierarchies by general topic, and with each topic there can be many sub-topics. On the Internet, there are over 14,000 news-groups, covering almost every conceivable topics from astrology to zoology. Discussions take place via e-mail, which is sent to the news-group's address. A news-group may be moderated or unmoderated. If a news-group is moderated, e-mail is automatically routed to the moderator, a person who screens all incoming e-mail to make sure it is appropriate before posting it to the news-group.

News-group servers around the world host news-groups that share information and commentary on predefined topics. Each group takes the form of a large bulletin board where members post and reply to messages, creating message threads. The open nature of news-groups encourages participation, but the discussions often become rambling and unfocused. As a result of so much active participation, News-groups can evolve into tight communities where certain

members tend to dominate the discussions.

(11) **Internet relay chat (IRC)**. This is an Internet feature that allows two or more people to communicate text at the same time, sometimes known as "real-time e-mail." chatting allows people who are simultaneously connected to the Internet to hold live, interactive written conversations. IRC allows people with shared interests to exchange ideas on any subject, such as diversity, research results, or just plain gossip. The user can browse for a "chat" site and check if anyone is online. Only people who happen to be signed on at the same time are able to chat because messages are not stored for later viewing as they are on Usenet News-groups. On the other hand, this function can be an effective communication tool if people who can benefit from interactive conversations set an appointed time to meet and talk about a particular topic. The limitation of this is that the topic is open to all without security so that intruders can also participate. IRC applications program is available free of charge from a number of Web sites.

(12) **Telephoning on the Web** is a new technology which allows individuals to have a telephone conversation on the web. While regular long distance telephone companies charge according to the number of minutes a call lasts, Internet service providers (ISPs) almost always charge customers flat monthly fee. With the proper software and microphones attached to their computers, Internet users can conduct long-distance and international conversations via their Internet connection, and pay for only the local call to their ISP. Vocal-Tec, Vox-ware, and other companies provide software that digitizes and compresses voice signals, and with slight delays, transmits the bits via the Internet link. Some Internet phone (I-phone) applications are bundled within browsers.

(13) **File Transfer** is another computer-aided system which, in addition to displaying information, can help organizations and individuals to install software on the Net that users can download. Downloading is the transferring of software from one computer to another via communication lines. This function is what is called File Transfer.

(14) **Group Support Systems (GSS)**, which may be referred to as electronic meeting systems, strive to take advantage of the power of a group to make better decisions than individuals acting alone. Many issues have been raised about the interaction of a group interested in reaching a decision. These issues include lack of participation by some members, and yet dominance by some other members. The increased importance of group decision making has initiated the design of computer systems to facilitate the interactions among the members of a group in reaching a decision. GSSs represent an attempt to make these group sessions more productive. This system provides computerized support for idea generation (brainstorming), organizing ideas, prioritizing (voting), and policy development (stakeholder identification). Each participant in a group session has the opportunity to provide input anonymously and simultaneously via the microcomputer keyboard. This should encourage creative thinking, since no one can be ridiculed for a "stupid idea." each idea or comment is evaluated on its own merits rather than in light of the person who offered it. Similarly, in a voting session, the participants will not be swayed by how someone else votes. Thus, more high quality ideas and decisions that truly represent the group can be reached. The new focus is to support the work team in all its endeavors, whether the team is operating in the same time frame and same place traditional meeting or in a different time or different place mode.

(15) **Computer/data Communication** constitute the movement of encoded information from

one point to another by means of electrical or optical transmission systems. These systems are often called data communication networks. Out of all the previously mentioned information technologies, computer or data communication have received the most attention recently. The new telecommunication technology includes the transmission of voice and image (graphical) as well as data. Previously, telecommunication meant voice transmission over telephone lines. Today, much telecommunication transmission has become digital data transmission through the use of computers. Thus, telecommunication is interacting at distance which requires connection of some points known as nodes. The connection of these nodes provide a network which is the connection of two or more computers together to facilitate communication among human beings. This is a progression from communication using paper-based systems to modern network communication.

The authors still have a vivid memory from the early 1980s when they witnessed first hand the use of the computer punch cards and data coding machine. Afterwards, microcomputers or PCs have dominated the scene because they became more powerful, efficient, faster, and requiring much less space than the old central processing units. In addition, today's computers are not just used to process and store data, for they proved that they could be linked and used for telecommunication purposes as well.

A telecommunication network typically contains diverse hardware and software components that need to work together to transmit information. These different components in a network can communicate by adhering to a common set of rules that enable them to talk to each other. This set of rules and procedures governing transmission between two points in a network is called a protocol. Thus, setting up a network means connecting a diverse group of computers and devices to communicate with each other.

The Information Superhighway is a new buzzword in telecommunication networking. It connotes a high-speed digital telecommunication network which can be national or international in scope and accessible by the general public rather than restricted to the use of specific members of an organization or sets of organizations. One major advantage of computer-mediated communication or the information superhighway is allowing users to communicate without the face-to-face context as well as obtaining and disseminating information without regard to their distance or location, ethnic background, race, religion, gender, and many other differences. This may be one way to bring a diverse group together and reach better decisions precluding the direct effect of individual as well as cultural differences.

Effects of Information Technology on Educational Change

Whether people like it or not, they are finding themselves faced with increasingly "paper less" environment of interactive media, distance learning, CD-ROMS, and Internet communication. Since interactions among diverse groups of individuals situated in various locations have become the norm because of major advances in the field of new information technology, it is believed that computer communication is very beneficial to higher education. It facilitates and fosters effective communication among individuals regardless of their geographical location, race, ethnicity, gender, socio-economic status, marital status, and so forth. Therefore, some of the problems, which face-to-face interactions may bring to the situation, can be eliminated. The individuals who are communicating do not need to be aware of each other's characteristics which

may create major conflicts among themselves. Emphasis can be placed on messages or their contents rather than on individuals introducing them.

In today's Cyber world or wireless communication, people encounter more information at an increasingly rapid rate and predictions about the penetration of new technology into households by the year two-thousand-one suggest that the popularity and continuing emergence of these technologies will not abate. Therefore, emerging electronic communication technologies promise to permeate all aspects of one's daily living (Olaniran, 1998).

The influence of computer communication has become very apparent and pervasive on education. Educators have integrated computers into their instructional practices from elementary schools all the way to research institutions. Distance learning and the Internet have been largely accepted and incorporated by academicians throughout the entire world. Everyone is trying to jump onto the bandwagon so nobody feels left behind. Therefore, offering courses through interactive media for geographically dispersed audiences has been very helpful in terms of reaching and accommodating more students. This fact promises to globalize current educational systems, making the information resources of the globe available to everyone at minimal costs (Shake, 1997). By doing so, students can learn from the best possible teachers without having to travel. In addition, distance learning generates a wealth of ideas through open forums benefitting rural communities and developing countries the most. Thus, with initial knowledge of digital literacy, students may use and benefit from resources of any on-line library in the world.

E-mail has proven to be versatile for educators. Thus, teachers have been using e-mail to make assignments, conduct important discussions, advise students, and evaluate their work on a regular basis. In addition, using the World Wide Web for instructional delivery has also been on the rise. Many institutions have web pages in which they include class materials. Furthermore, many faculty members are currently employing chat rooms on the web to add the visual and spacial dimensions of a regular classroom setting, which are usually missing from e-mail interactions. McCollum (1997) stated that students can stimulate the traditional classroom experience by using digital photographs of themselves. Using computer communication for distance learning and e-mailing has greatly affected the academy life and it will continue to affect it in the future. While these effects may constitute a blessing for diverse populations, they may be a curse for others. Various people from all walks of life can interact effectively and solve many of their problems without the need to a face-to-face encounter. However, many people still prefer the face-to-face interaction, even though they may welcome the new change for specific purposes. In sum, every technology has its advantages and disadvantages and its proponents and opponents. Computer-mediated communication is no exception but it is here to stay and is not going to fade very soon.

Means of Transforming Classroom Interaction in Higher Education

LearningSpace and Listservs are two of these programs which several prominent institutions of higher education started to use for electronic and digital course delivery. These programs are facilitating interaction among faculty and students and helping them learn from faraway distances without leaving their jobs or communities. For instance, LearningSpace Web unique delivery capabilities would allow institutions to create courses which students as well as instructors can access whether they are online or offline. It also makes it easier to learn from wherever a person

is and reduces critical network bandwidth requirements. Thus, since LearningSpace courses are designed to be accessed at any time and from anywhere, students benefit from the thoughtful interaction of one another in each course rather than relying just on those able to meet the schedule requirements of traditional face-to-face interaction courses. Being an alternative to traditional instruction, LearningSpace provides equal learning opportunities to all students without limitations to time or place.

LearningSpace consists of several different databases among which students may navigate in order to receive their course material by accessing this program. These databases are: **(1) The Schedule** which provides students with a particular course overview of what to do and when to do it. Thus, the schedule database is used to list courses, assignments, and other assessments such as, quizzes, exams, and final papers to guide students from the beginning to the end of each course. **(2) The MediaCenter** database is used to allow immediate and searchable access to all reference materials for each offered course such as, links to web sites, videos, and other forms of multimedia. **(3) The CourseRoom** database is used to host collaborative interchange between students and instructors. Thus, this database allows participants to post documents so others may read them and respond to them, resulting in a threaded discussion among all of those who are involved. **(4) The Profiles** database is used to provide students and instructors a specific place in order to enter personal data initiating a friendly atmosphere for learning from one another and getting to know each other. **(5) The LearningSpace Central** database gives instructors the power to control the performance functions which help to manage courses. **(6) The Assessment Manager** database is used to help instructors create and store tests, build questions and create assessments, manage class surveys and assign grades. It also helps in providing evaluations and feedback to students. In short, instructors have six databases at their disposal whereas students can have only four databases to use.

When developing a new course, an instructor can choose from a number of options which are available. For instance, one option instructors may choose is the quick course option (also called quick path), which consists of using automatic default settings allowing rapid course creation through using predetermined default values. These defaults may be altered later if so desired. Another option instructors may also use is the custom option (also called custom path), which is a method allowing more flexibility by specifying default choices of the various databases. Selecting the custom path is more recommended than the quick path. For this choice, instructors must, first, run what is called a course builder, which is a tool for helping to create and use an outline. Second, instructors may open the course immediately after its creation. And, third, they may return to central, which means returning to LearningSpace Central in order to check whether the course has been created and added to the list of other possible courses.

At this point instructors can describe their course on a page called "course information," fill in a "course code," "course type," and "course name." Next, instructors may indicate their "course location," "schedule option," "course room option," and a host of other features available to choose from for consistently running the course. After completing the creation of a course, instructors must load the database icons, consisting of the schedule, Mediacenter, Courseroom, profiles, and assessment, to their desktop computer.

When accessing LearningSpace for the first time, students will get a page containing the Schedule, MediaCenter, CourseRoom, and Profiles databases which will take them, eventually,

to the respective sections of the course they are enrolled in. The Assessment Manager is usually located at the bottom right corner for the instructor use. The yellow Orientation button gives a short description of each LearningSpace section, the Description button gives the course description, the Help button assists users in accessing the course, and the Exit button returns users to the course list. In addition, there are four text links at the bottom; select, new, edit, and delete; allowing users to customize the page. For instance, the link, select, allows users to choose from previously created welcome pages; the link, new, helps users create a new welcome page; the link, edit, helps users to make changes to any of the welcome pages they have created; and, finally, the delete link allows users to remove any welcome page.

As to text properties, users may format their text as is the case with any word processor. They can right click anywhere in their content and select text properties from the pop-up menu in order to designate the specific text before making any changes. The text window allows users to all normal modifications such as font, size, style, and color. By clicking the tabs in the appropriate box, users may also have more options available such as alignment and line spacing. In addition, users can create URL links in their documents. To do so, users have to go to a web page and copy the URL to the clipboard. Once they have done this function, they can simply paste the URL into their specific document and the link will automatically be created. LearningSpace offers several other functions for users. Capella University, a for profit distance learning institution located in Minneapolis, Minnesota, has been using the LearningSpace program for about two years. All of their students in this program are graduate. Several other universities have been offering few courses and are currently on their way for full-fledged programs using LearningSpace, Listserv, ITV, or other various types of programs.

Listserv

Listserv communications offer a great opportunity for students to discuss a topic where everyone shares with everyone else. A listserv, often set up by the instructor, is a basic e-mail repeater where all e-mail messages addressed to the listserv are then redistributed to every member that has subscribed to the listserv. Anyone with access to e-mail can join and participate in the listserv by sending a simple subscribe message to the listserv administrator. Likewise, participants that want to leave the listserv can do so by un-subscribing in the same manner. One of the major reasons for the popularity of the listserv approach is its ease of participation and administration. Because of its ease, the listserv has become a standard method of soliciting interaction in both traditional as well as non-traditional classes.

The advantages of the listserv approach are numerous. Listserv is a great equalizer. It allows all parties in the discussion to speak in exactly the same manner. It equalizes the differences in technology between participants because of the limited bandwidth of e-mail and the widespread distribution and access to e-mail. Everyone can have an e-mail account set up in a short amount of time, making the entry barrier to the listserv very low. Another advantage of the listserv is the timeliness of the information. Given the limited bandwidth requirements of text e-mail, listserv can turn email around to participants very quickly. Unlike the delays in creating a web page or the reciprocity problems of telephone communications, listserv posts the information almost immediately for all participants to see. Another advantage is the ease of administration. Once the listserv is created (which takes just a few minutes for most systems), the administration time

is non-existent unless the server encounters a problem which would affect all functionality, and are becoming less frequent as server operating systems are becoming more reliable. One final advantage is the impersonal nature of the discussion. On topics that are hard to discuss, the anonymity of the listserv may be the only way that people can really talk about their real feelings.

In terms of the disadvantages of the listserv approach, there are some that are worthy of mention. The first is quite serious. Listserv discussions have become a common place to pick up viruses and variants that can damage a large number of e-mail recipients very quickly. Discussion groups and listserv often have little virus control that can be imposed (unless it is a "top end" site that has resources to buy the software). So users' computers getting e-mail from a listserv could be infected with a virus if they do not have some sort of anti-virus software deployed. Often the e-mail is not the virus, but the attachments can be infected. The best defense against this disadvantage is for system administrators and instructors to play an active role in instructing people to get protection and the penalties for purposefully infecting other participants' computer systems. Another disadvantage of the listserv approach is one of its advantages - the impersonal nature of the communication. Just like some sensitive topics are more successfully addressed in an impersonal manner, other topics are best addressed in a higher bandwidth media. Media richness theory suggests that people pick the most appropriate media for the task they need to complete (Crawford and Strohkirch, in press).

Given that the listserv is a very narrow media, other media may be necessary to accomplish certain tasks. A final disadvantage of the listserv is the lack of filtering and the sheer volume of comments. Listserv participants generally have free reign to post any e-mail. As such, it is not uncommon to have many e-mail messages waiting for anyone when logging on next. While one does not need much time in the way of administration, one will be spending more time reading e-mail (depending on the popularity of the listserv). This can be very frustrating when people post "books" when they really just wanted a paragraph.

Despite its disadvantages, listserv offers a tool that instructors can use with very little training and even less effort. Given the popularity of listserv there is no reason to expect that it will disappear soon. Many professors literally swear by them, some swear at them, but almost everyone agrees that the listserv is a great way to increase the interactivity in a class.

Videotaped Instruction

Videotaped instruction is an inexpensive and relatively "low tech" means of providing educational experiences to students at distant locations. One potential disadvantage of this instructional method is the lack of student feedback. Instructors may also find it difficult to create rapport and motivate students. Videotaped instruction eliminates the use of proxemics and touch to convey an instructional message. Past research has documented the role nonverbal immediacy plays in enhancing students' affective and cognitive learning. Guerrero and Miller (1998) examined associations between nonverbal behaviors and initial judgments of instructor competence and course content. They focused on initial impressions because of the importance of nonverbal behavior in forming first impressions and effecting levels of student motivation.

Creating an engaging environment for videotaped instruction is a difficult task. Instructors can display enthusiasm for the course through facial expressions and upper body movements. These can be emphasized by zooming in with the camera, making facial expressions and gestures more

prominent than in a traditional classroom. Behaviors reflecting nonverbal involvement and conversational skill (expressiveness/warmth, composure/fluency, eye contact and articulation/clarity) were positively associated with favorable impressions of instructors and courses. Of the nonverbal behaviors listed in the previous sentence, instructors should focus on increasing primarily expressiveness and warmth and can devote less attention to eye contact, fluency and composure.

Computer-Mediated Communication (CMC)

Olaniran, Savage, and Sorenson (1996) posited that we need to introduce students to computer-mediated group discussion in order to prepare them for the work environment they will enter. Witmer (1998) noted that students must learn not only how to use CMC but also when to use it. Instructors need to recognize that students enter the classroom with varying degrees of technical expertise. The vocabulary of CMC creates difficulties for some students. Finally, some students see the use of CMC discussion groups as extra work, not part of content learning for the course. Instruction must be provided to help students understand the technology.

Brandon and Hollingshead (1999) urged the use of collaborative learning concepts to bridge the distance between students at various sites. They advocated the use of activities which generate multiple viewpoints and cognitively challenge each member of the group as a means to more fully engage all students and bridge the distances between them.

Interactive Learning Networks

Comeaux (1995) studied the use of interactive distance learning networks which allow participants to see and hear each other from remote locations at real-time speeds. The simultaneous audio and video capability is relatively new to education. To effectively use this technology students should be viewed "as collaborators in the pursuit and creation of knowledge" (Bailey & Cotlar, 1994, p. 193). Instructors should avoid being "talking heads" (Comeaux, 1995). Instructors need to encourage student interaction across the sites. They need to encourage students to wait for audio protocol (2 - 3 second delay between speakers). They also need to spend time acquainting the students with technology and work to establish a relaxed classroom atmosphere. Let the students spend some time playing with the equipment and becoming accustomed to the noise the camera makes. Students should introduce themselves to each other at all sites. Remember to incorporate students questions and comments in class. Students disliked seeing themselves on the monitors. Comeaux recommended having an instructor, or a graduate student or a technical person at each site to facilitate discussion and perform administrative duties. Sites could go "off line" for short discussions and then go back "on line" to share their conclusions with the rest of the group. Students at all sites must feel they are an integral part of the class.

In distance education students' nonverbal responsiveness cues may be lost or distorted, disrupting the transactional nature of student-teacher messages. Mottet (2000) concluded that although institutions may claim interactive technology simulates the traditional classroom, the data indicates otherwise. Interactive television instructors reported a significant decrease in ability to perceive distance students' nonverbal responsiveness. Audible nonverbal cues may be transmitted somewhat better than nonverbal visual cues. Furthermore, ITV instructors ability to

perceive students nonverbal responsiveness cues greatly influenced instructors perceptions of their relationships with their students. The ability to perceive audible nonverbal cues (such as students' vocal inflections and vocal variety) impacted views of teaching effectiveness, teaching satisfaction, and teacher-student interpersonal relationships. Finally, most instructors preferred teaching in the traditional classroom, received higher teaching evaluations, felt more satisfied and reported better teacher-student relationships.

Conclusion

LearningSpace and Listserv programs have been quite popular and it is very likely that they continue to be implemented as means of increasing interaction in virtual classes. Both of them offer simple, fast, and cheap alternative ways to video-conferencing, but there are limitations to their implementation. As with any media, the use must be weighed against the necessity for a greater bandwidth solution and the costs and benefits of other alternatives. So far, many educators have used these programs because they met their needs. As alternative technologies improve and decrease in cost, the attractiveness of these may fade.

Previous research has found positive associations between verbal immediacy and student learning. Jaasma and Koper (1999) studied the importance of out-of-class communication (OCC) between instructors and students. They found that higher levels of OCC were associated with higher levels of student motivation. Faculty should use verbal immediacy to encourage students to engage in OCC.

Witt and Wheelless (1999) noted that students enrolling in their first distance education course probably hold different expectations of nonverbal immediacy than students who have already taken a distance education course. They found that students who had never taken a distance education course expected less nonverbal immediacy than students who had already taken a distance education course. New and experienced distance education students expected less nonverbal immediacy than did students in traditional classrooms. Low expectancies may lead to low enrollment so educators need to work to increase students expectations about interaction and the immediacy of the distance education learning environment.

Mottet (2000) stressed how important it is that instructors have realistic expectations concerning teaching distance education courses. Instructors need to realize that they will have less control over the delivery of their courses and how they will be impacted by reduced student responsiveness cues. Instructors need to familiarize distance learners with the technology and how it dulls or filters out certain nonverbal behaviors. This should make students more cognizant about their own nonverbal behavior and how they interpret their instructor's nonverbal behavior, or perceived lack of nonverbal behavior. Instructors also need to become better listeners to maximize the responsiveness cues that they do receive. All instructors should try to work closely with administrators to insure that new technologies effectively transmit both audible and visual nonverbal messages.

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